FAST Browser - L6: (34) (conductive | US 4978360 A | Tag: S | Doc: 18/34 | Format: KWIC

File Edit View Tools Window Help

	Document ID	Title
16	US 5198281 A	Non-woven flexible multiply t
17	US 5122417 A	Fiber-reinforced composite re
18	US 4978360 A	Method of manufacturing a cor
19	US 4939002 A	Poltrusion apparatus and meth

US-PAT-NO: 4978360

DOCUMENT-IDENTIFIER: US 4978360 A

Viewer

Times New Roman 12

a composite implant prosthesis

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Detailed Description Text - DETX (5):

In a second alternative, referred to as powder coating, a conductive reinforcing fiber is passed through a fluidized bed of matrix polymer powder. A current is passed through the fiber to heat it resistively, or the same effect can also be achieved by electrostatic deposition. The tacky, polymer coated fiber is then flattened between a pair of rollers or pultruded to yield a uniform fiber/polymer tow. Next a braided sheath is applied in the same manner mentioned earlier to provide an angle-ply of reinforcing fibers. The angular orientation is about +45.degree. relative to a longitudinal axis for the core. Preferably, the braided layer is polymer rich to avoid delamination under cyclic loading condition. This can be achieved by using a preimpregnated fiber tow from the solution, electrostatic or resistance heating, or using a pultruded rod with a polymer rich outer surface. Another pultrusion step integrally binds the braided sheath to the outer surface of the core, and a thermoform step imparts the final curved shape by a pair of matching dies so that a cutter will separate discrete elements from the continuous rod for application of the outer casing of chopped fiber reinforced matrix polymer.

Current US Cross Reference Classification - CCXR (1):

156/180

Issued US Cross Reference Classification - CIXR (4):

156/180

United States Patent [19]

Devanathan

[11] **Patent Number: 4,978,360**

[45] **Date of Patent: Dec. 18, 1990**

[54] **METHOD OF MANUFACTURING A COMPOSITE IMPLANT PROSTHESIS**

[75] Inventor: Thirumalai N. C. Devanathan, Warsaw, Ind.

[73] Assignee: Zimmer, Inc., Warsaw, Ind.

[21] Appl. No.: 426,641

[22] Filed: Oct. 26, 1989

Related U.S. Application Data

[60] Division of Ser. No. 173,643, Jun. 21, 1989, Pat. No. 4,921,297, which is a continuation of Ser. No. 377,531, Nov. 28, 1988, abandoned, which is a continuation of Ser. No. 835,496, Mar. 3, 1986, abandoned.

[51] Int. Cl.[5] A61F 2/32

[52] U.S. Cl. 623/66; 264/136; 264/137; 264/257; 156/180

[58] Field of Search 264/134, 136, 137, 255, 264/257, 256; 156/180, 181; 623/23, 16, 66

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,893,196 7/1975 Hochman ..... 623/23 X

4,058,581 11/1977 Park 264/136

4,710,903 6/1988 Koeneman et al. ..... 623/23 X

OTHER PUBLICATIONS

Klein, "Braids and Knits: Reinforcement in Multidirections", Advanced Composites, Sep./Oct. 1987, pp. 36–48.

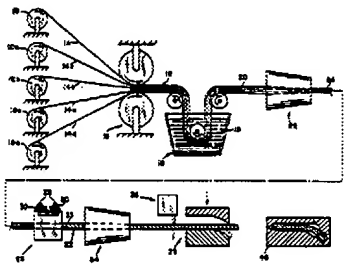
Primary Examiner—Alan W. Cannon

Attorney, Agent, or Firm—Paul David Schoenle

[57] **ABSTRACT**

A composite implant prosthesis comprising a core constructed from a plurality of carbon fibers, a first casing formed from a braided sheath of carbon fibers and a second casing enclosing the core and first casing to define an outer surface contour for the composite implant prosthesis. The method for constructing the composite implant prosthesis includes the steps of pultruding the core from a polymer impregnated tow, braiding the first casing to the pultruded core and applying the second casing thereto. The pultruding and braiding steps are performed in a continuous process while the second casing is applied to a discrete element formed from the core.

4 Claims, 1 Drawing Sheet



US-PAT-NO: 5492743

DOCUMENT-IDENTIFIER: US 5492743 A

TITLE: Pultruded member with functional features

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Detailed Description Text - DETX (9):

Any suitable polymer matrix may be employed in the practice of the present invention. The polymer may be insulating or **conducting**. If cross directional electrical connection is desired along the edges of the pultrusion a **conducting** polymer or **conductive** additives to the polymer may be used. Conversely, if insulating properties are desired along the edges of the pultrusion an insulating polymer may be used, or insulating fibers can be used in the outer periphery of the pultruded configuration and **conducting** fibers can be configured to reside away from the edges.

Detailed Description Text - DETX (10):

Typically, the polymer is selected from the group of structural thermoplastic and thermosetting resins. Polyesters, epoxies, vinyl esters, polyetheretherketones, polyetherimides, polyethersulphones, high density polyethylenes, polycarbonates, acrylonitrile-butadiene-styrene (ABS) polypropylene and nylon are in general, suitable materials with the thermosetting polyesters being preferred due to their short cure time, relative chemical inertness and low cost. If an elastomeric matrix is desired, a silicone, fluorosilicone or polyurethane elastomer may be chosen for the polymer matrix. Typical specific materials include Hetron 613, Arpol 7030 and 7362 available from Ashland Oil, Inc., Dion Iso 6315 available from Koppers Company, Inc. and Silmar S-7956 available from Vestron Corporation. For additional information on suitable resins attention is directed to Chapter 4 of the above-referenced Handbook by Meyer. Other materials may be added to the polymer bath to provide improved properties such as weather, corrosion or flame resistance as desired. In addition, the polymer bath may contain fillers such as calcium carbonate, alumina, silica or pigments to provide a certain color or **lubricants** to reduce friction, for example, in sliding members. Further additives to alter the viscosity, surface tension or to assist in bonding the pultrusion to the other materials may be added. Naturally, if the fiber has an

organic sizing applied to it, a compatible polymer should be selected. For example, if an epoxy resin is being used, it would be appropriate to add an epoxy sizing to the fiber to promote adhesion.

Detailed Description Text - DETX (11):

The carrier tape with the functional features and any wall spacers may take various forms depending upon the cross section of the tubular pultruded member. To function properly, however, in providing the positioning of the functional features the tape and functional features as well as any wall spacers should be capable of withstanding the temperatures involved in the pultrusion process. The functional features and any spacers may be on the one surface of the carrier tape or alternatively extend through the tape. The carrier tape functional features and any spacers can be made of materials selected to provide desirable properties in the pultruded member and accordingly, may be selected for their conductivity or insulating properties. They may be selected of the same or different material but must be able to withstand the temperature (typically 250.degree. to 300.degree. F.) of the pultrusion process without degrading. Ideally, they are selected to be compatible with the polymers used and bond to the polymers otherwise the carrier tape functional features and any spacers will delaminate and not provide the desired structural reinforcing properties. Typically, polyesters such as Mylar.TM. and other high temperature plastic materials may be used to provide the carrier tape functional features and spacers. If insulating properties are desired a polyester carrier tape with polyester functional features and any wall spacers may be used. Alternatively, if electrically **conductive** properties are desired, thin metal foil such as aluminum or steel may be used. Metal carrier tapes can provide electrical connectivity for grounds and power and/or signal voltages. Finally, if desired, a solid pultrusion may be used as both the carrier tape and the functional feature. When using the carrier tape with functional features together with a mat reinforcement, it is preferable to provide a hole in the mat reinforcement to enable the functional features and any spacers to extend through it. To this end prepunched reinforcement mats may be used or if the functional feature or spacer is a very hard solid such as steel may allow the thickness of the mat to compress and poke itself through the mat. Alternatively, of course, a mat hole punching assembly may be placed ahead of the mat polymer bath.

Field of Search Class/SubClass - FSCS (4):

156/180

US-PAT-NO: 4469541

DOCUMENT-IDENTIFIER: US 4469541 A

TITLE: Method for forming reinforced plastic composite articles

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Detailed Description Text - DETX (13):

Any of a number of commercially available resin matrix compositions can be used for impregnating the reinforcing materials such as the strand or mat material. The matrix should be capable at some stage of the process, of being liquified and softened for a period of time, and also should be sufficient to flow around the filaments forming the strands and the mat and web material. In addition, the matrix should be capable of achieving a rigid state of complete polymerization to become a rigid solid member with the reinforcing material and should also possess ability to adhere to the reinforced material. Some of the suitable thermoplastic resin matrix materials which can be employed for impregnating the reinforcing materials are resins such as polypropylene, polycarbonates, and the like. In addition, some thermosetting resins, such as phenolics, epoxy type resins and various polyesters may also be used. These polyesters are preferably the condensation products from phthalic anhydride, maleic anhydride, ethylene or propylene glycols with a styrene or diallyl phthalate monomer. Generally, the thermosetting resins should be capable of being fused into an insoluble, non-heat softening mass upon application of heat or similar method of triggering the catalytic system. Other binders which may be used are hard **waxes,** eutectic ceramics, eutectic metals, synthetic rubbers and the like.

Detailed Description Text - DETX (21):

When the **conductive** or semiconductive fibers, such as boron, etc., are used in the reinforcing material it may be desirable to employ an inductive type of augmented cure, such as the augmented inductive type of curing system as taught in U.S. Pat. No. 3,960,629 date June 1, 1976 to William B. Goldsworthy.

Detailed Description Text - DETX (35):

In the embodiment of the invention as illustrated in FIG. 5, the first

die-forming member may be provided with a plurality of vertically located cartridge heaters 132 and which are connected to a suitable source of electrical power by suitable current carrying **conductors** (not shown). Further, if desired, the second die-forming member 106 may similarly be provided with internal bores adapted to receive cartridge heaters 134 and which are connected to the suitable source of electrical power. These cartridge heaters 132 and/or 134 are designed to provide the final curing radiation to the binder which has been impregnated in the reinforced plastic composite material.

Issued US Original Classification - CIOR (1):
156/180

Current US Original Classification - CCOR (1):
156/180

Field of Search Class/SubClass - FSCS (1):
156/180

US Reference US Original Classification - UROR (1):
156/180

US Reference US Original Classification - UROR (4):
156/180

US Reference US Original Classification - UROR (5):
156/180

US Reference Group - URGP (1):
2694661 19541100 Meyer **156/180**

US Reference Group - URGP (4):
3873399 19750300 Goldsworthy et al. **156/180**

US Reference Group - URGP (5):

4276337 19810600 Coonrod **156/180**

US-PAT-NO: 3769127

DOCUMENT-IDENTIFIER: US 3769127 A

TITLE: METHOD AND APPARATUS FOR PRODUCING FILAMENT REINFORCED
TUBULAR PRODUCTS ON A CONTINUOUS BASIS

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Brief Summary Text - BSTX (4):

Until recently, only metal pipe was able to withstand liquid working pressures above approximately one hundred pounds per square inch in a one inch diameter pipe. Normally, tap water of the type delivered to consumers is corrosive to metal pipe dependent upon the chemical constituents of the water. Furthermore, most chemicals will attack metal pipe, and sometimes, these reactions may be quite violent and destructive. In order to obviate this corrosion problem, small diameter pipes which were used for **conducting** fluids at relatively low pressure were made from copper. Pipes with larger diameters were made from steel and stainless steel, but all types required periodic replacement. Furthermore, many of the steel pipes incorporated protective innerlinings made from ceramics and thermoplastic materials, rubber, etc. However, the pipe-to-pipe connecting joints were vulnerable since the pipe lining protected only the internal annular wall of the pipe from corrosion and not the connecting joint. The methods for bridging these joints are generally expensive and oftentimes dangerous as well.

Brief Summary Text - BSTX (15):

It is also an object of the present invention to produce a high performance filament reinforced pipe which is capable of **conducting** corrosive liquids at high flow rates, and which is capable of withstanding high internal pressures.

Detailed Description Text - DETX (33):

Any material which is capable at some stage of the process of being liquefied and softened for a period of time may be employed as the resin binder or so-called "matrix". Furthermore, the matrix must have a high electrical loss tangent in the monemeric form and a low electrical loss tangent in the

polymeric form. The matrix should be sufficient to flow into the filament and fill the interstices between adjacent filaments and layers thereof before achieving a rigid state through cooling or completing polymerization to become a rigid solid. The matrix should also possess the ability to adhere to the reinforcement. Some examples of the suitable binders or matrix which can be employed in the present invention are various thermoplastic resins, such as nylon, polyethylene, polypropylene, many of the polycarbonates, polyesters, etc. In addition, thermosetting resins such as polyesters, many of the phenolics and epoxy etc. can be used. Generally, the thermosetting resins should be capable of being fused into an insoluble, nonheat softening mass upon application of heat or similar method of triggering the catalytic system. Other binders or matrices are hard **waxes,** eutectic ceramics, eutectic metals, synthetic rubbers, etc.

Detailed Description Text - DETX (154):

There are a number of R-F type electrode systems which may be used in accordance with the present invention. One of the electrode systems employing coaxial electrodes is illustrated in FIG. 3. Another of these electrode systems is illustrated in FIGS. 27 and 28 and employs a type of ring or cuff type electrode system. This electrode system employs a series of axially spaced rings 290 which are connected by a common **conductor** 291 and which are in turn connected to a suitable R-F generator (not shown). Where the electrical field passes across all portions of the tubular member in a radial direction in the coaxial electrode system, the electrical energy passes through the tubular structure in the manner as illustrated in FIG. 28. It can be seen that the electrical energy essentially passes through the tubular structure in a somewhat axial direction.

Detailed Description Text - DETX (156):

It is also possible to provide an electrode structure as illustrated in FIG. 31 where a series of axially extending, radially spaced **conductors** 296 are disposed about the tubular structure being produced. Each of these **conductors** is connected by a common band 297, which is in turn connected to a suitable R-F generator (not shown). Again, the field current forms a pattern somewhat similar to that illustrated in FIG. 28.

Current US Cross Reference Classification - CCXR (3):

156/180

Issued US Cross Reference Classification - CIXR (3):
156/180

DOCUMENT-IDENTIFIER: US 20030075077 A1

TITLE: Water wax emulsion cleaner and waxer

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Claims Text - CLTX (47):

46. The mixture of claim 41 wherein said wax is selected from the group consisting of carnauba wax, microcrystalline wax, orange peel wax, dimethiconol **hydroxystearate wax** and candelilla wax.

DOCUMENT-IDENTIFIER: US 20030031820 A1

TITLE: Composite sheet, method of preparing same, and thermosensitive recording adhesive label sheet having same

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Detail Description Paragraph - DETX (142):

[0157] The thermosensitive recording layer may contain a heat-fusible material preferably having a melting point of 50-200.degree. C. Illustrative of suitable heat-fusible material are fatty acids such as stearic acid and behenic acid; fatty acid esters; fatty amides such as stearamide and palmitamide; fatty acid salts such as zinc stearate, calcium stearate, aluminum stearate, zinc plamitate and zinc behenate; and **waxes such as stearate wax,** polyethylene wax, carnauba wax, microcrystalline wax and carboxyl-modified paraffin wax, condensation products of an aromatic carboxylic acid with an amine; phenyl benzoate; higher straight chain glycols; dialkyl 3,4-epoxy-hexahydrophthalates; and higher ketones.